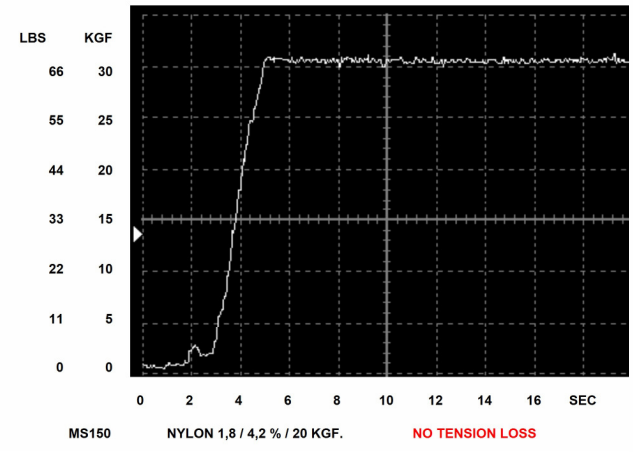
THE IMPORTANCE OF CONSTANT PULL FOR A TENSIONER

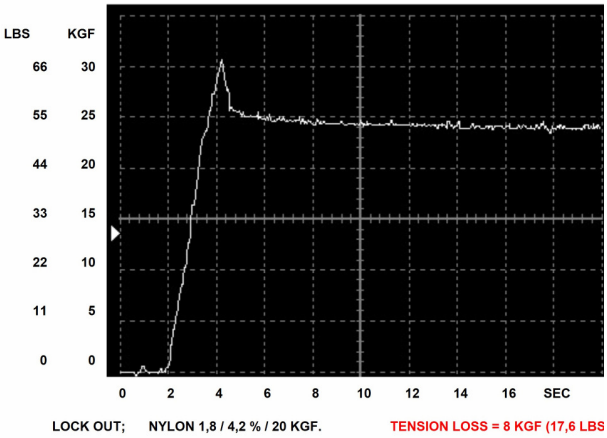
Different tension systems:
Stringing machines are supplied with different tension systems, which can be divided in 2 major groups, constant pull and “non-constant Pull”.
Constant pull machines are supplied as electronic and as mechanical CP units.
There are mechanical (lock out) and electronic non-constant pull machines.

The importance of constant pull.
Strings need between 3 and 10 seconds time to stretch when they are tensioned. A constant pull tension unit keeps the tension in the string constant during this elongation of the string. a non-constant pull tensioner looses tension depending on the type of string and on the speed of pulling. The figures show the tension on a perfect constant pull machine and on a non-constant pull unit.

"SMART-SPRING TENSIONER"



LOCK OUT TENSIONER WITH NYLON MULTIFILAMENT STRINGS.



Constant pull accuracy is the actual accuracy of a tensioner.
The constant pull accuracy is the ‘quality” of a tensioner to compensate exactly for the amount of loss of tension in the string that is caused by the slow elongation of the string. It is difficulty for many systems to compensate for very small losses, which results in higher tensions because the tensioner “overshoots” the adjusted tension.
The actual accuracy of a tension system is not in the first pull but in the following ones.

Different constant pull (CP) systems:
Stringing machines are supplied with different CP tension systems, which can be divided in 2 major groups:
1) Mechanical Constant pull.
2) Electronic Constant pull.

Mechanical Constant Pull (CP).
There are 2 different mechanical CP systems:
1) Drop weight systems, which have the quality that the tension is the same for every angle of the lever.
2) Spring driven systems.
In this system, , the tensioning power is supplied by a big spring, the power is supplied by the stringer when he puts the foot pedal down.

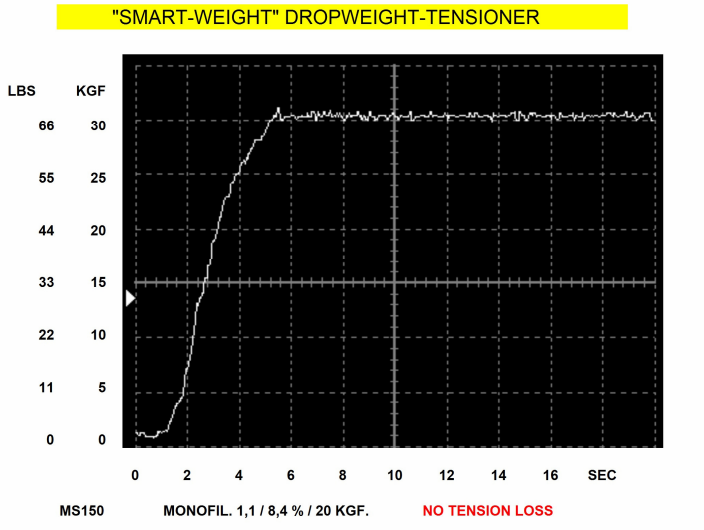
Drop weight CP systems.

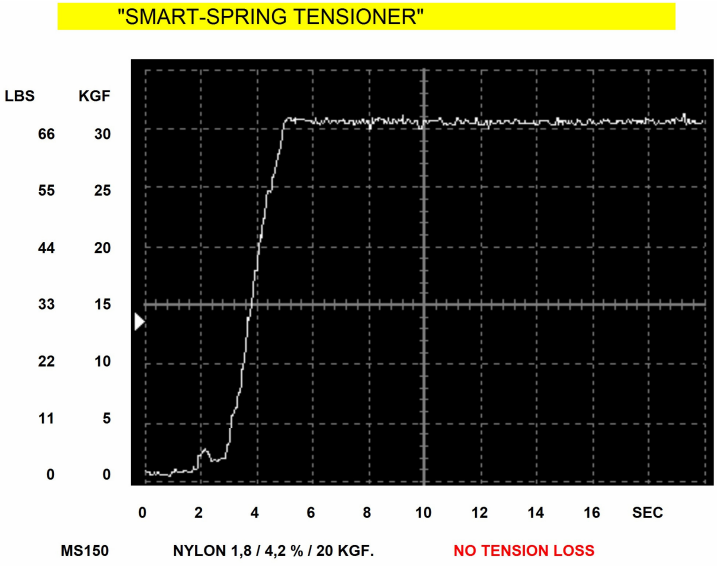
The constant pull accuracy of drop weight CP systems is very high. The tension head will always position in a situation where the tension in the string is in balance with the force of the weigh-arm.

Such a system can only overshoot the adjusted tension when the stringer forces the lever down, as soon as he releases the lever the tension will return to the adjusted tension.

The graph shows the tension applied by a “smart weight” drop weight system.

Important condition for a high end drop weight system is that the tension is independent of the angle of the lever.





“Smart spring systems”

The constant pull accuracy of “Smart spring systems” is very high. The tension head will always position in a situation where the tension in the string is in balance with the force of the drive system.

Such a system can not overshoot the adjusted tension the Graph shows the tension applied by a “Smart spring” tension system.

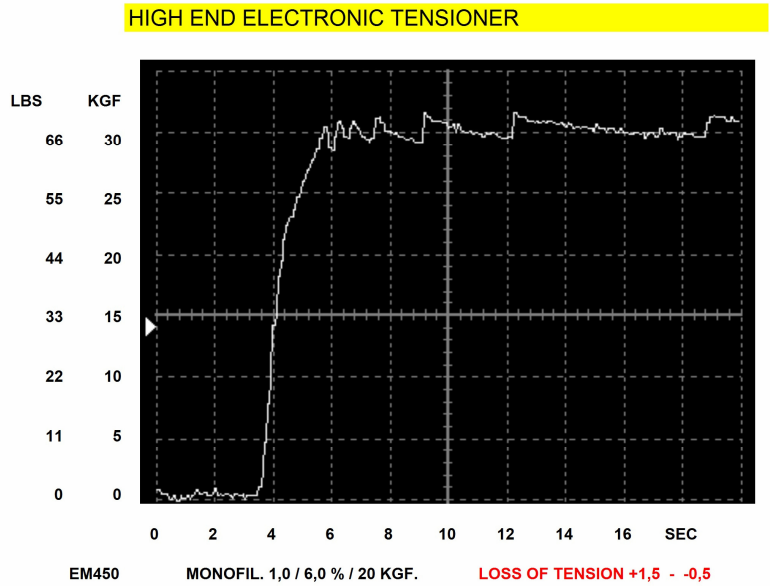
It needs regular calibration.

Electronic CP systems.

The graph shows the tension of a “high end” electronic unit.

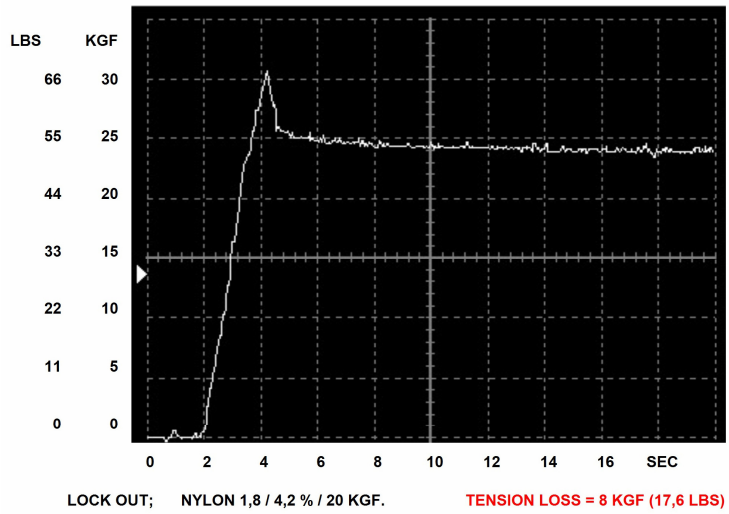
It is very difficult for an electronic machine to approximate the CP-accuracy of a CP drop weight system for several reasons:

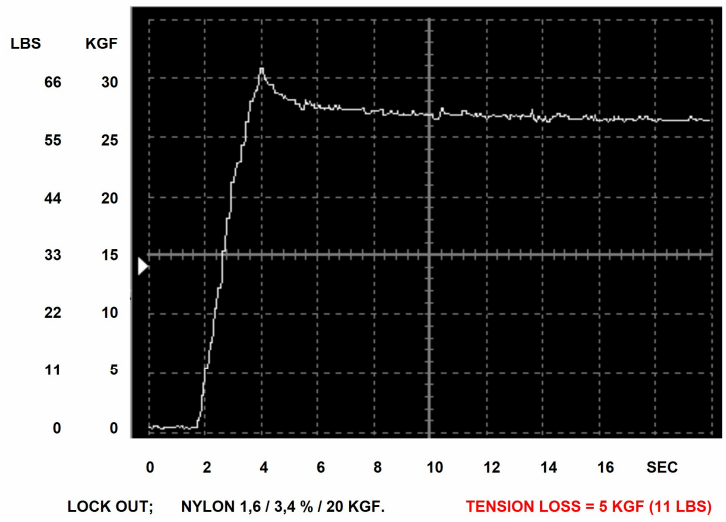
- It must have a very accurate tension measuring system.
- The measuring system must stop the drive motor very accurately, when the adjusted tension is reached.
- It is very difficult to compensate for small losses in tension accurately: The motor must start and stop only for a minimum stroke. This is the reason that electronic CP machines often string at higher stiffness, they tend to overshoot the adjusted tension



Cheaper electronic machines:
It is impossible for cheaper electronic machines to achieve a useful CP accuracy because an accurate system needs a high tech measuring system and a high quality drive system, which are both expensive.

LOCK OUT TENSIONER WITH NYLON MULTIFILAMENT STRINGS.





"Non- constant pull tension units".
A "non-constant pull" machine is always very inaccurate: It is not constant pull and the resulting tension depends on the elongation characteristic of the string and on the speed of pulling. When the stringer pulls quicker he looses more tension. The 2 graphs shows the tension of a Lock out machine with 2 different nylon strings pulled at the same speed.
The loss of tension with the stiffer string is 11 lbs and with the string with more elongation 17,6 lbs.

Some conclusions:
* Only high quality electronic machines are accurate.
* Mechanical constant pull system are very accurate and cheap in relation to electronic systems.
* When non constant pull units are used it is best to use strings with the same elongation characteristics. The difference in stringbed stiffness will be lower then.
